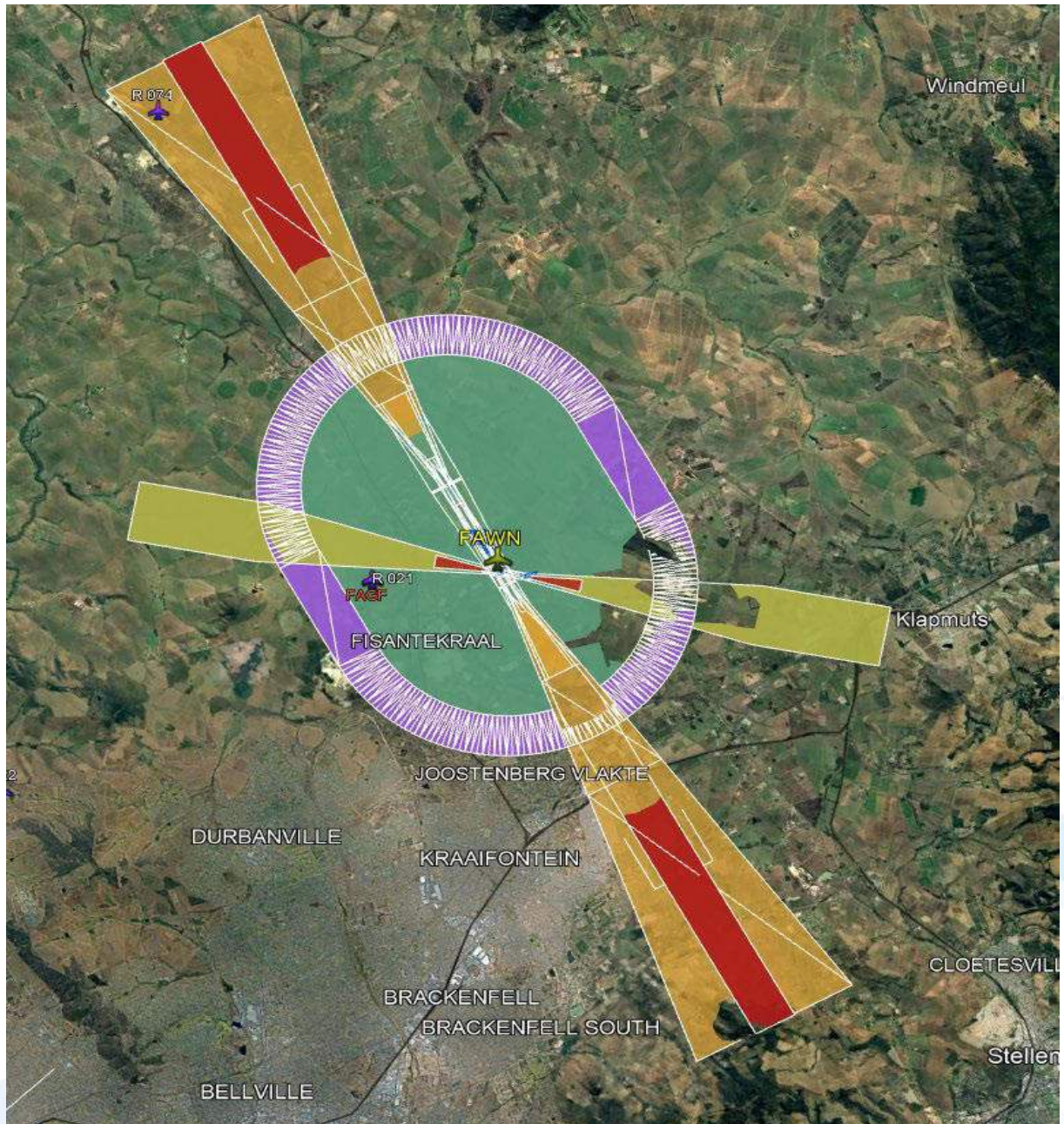


# Annexure 26

ICAO Amended Ann.  
14 OLS Report by Air  
Traffic and Navigation  
Services (ATNS)



**ICAO AMENDED ANNEX 14 OBSTACLE ASSESSMENT REPORT,  
FOR CAPE WINELANDS AIRPORT  
ATNS/ANNEX 14 - 04/10/2022  
ISSUE 2**





## APPROVAL PAGE

TITLE : ICAO AMENDED ANNEX 14 OBSTACLE ASSESSMENT REPORT, FOR CAPE  
WINELANDS AIRPORT

REPORT NUMBER : ATNS/ANNEX 14 - 04/10/2022

CLASSIFICATION : CONFIDENTIAL

SYNOPSIS : This report contains the results of the ICAO Annex 14 Obstacle  
Assessment for Cape Winelands Airport, as part of ATNS' initial WGS84  
survey project.

DISTRIBUTION : Refer to distribution page.

PREPARED BY : ATNS

COMPLETED BY : Graham Mondzinger (Obstacle Evaluator)

DATE : 04 October 2022



## DISTRIBUTION PAGE

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## CONTENTS

|                                                   | Page  |
|---------------------------------------------------|-------|
| 1. INTRODUCTION                                   | 5     |
| 1.1 PURPOSE                                       | 5     |
| 1.2 DATA USED                                     | 6     |
| 1.3 ELECTRONIC DATA                               | 6     |
| 1.4 UNITS USED                                    | 6     |
| 1.5 RUNWAY COORDINATES                            | 6     |
| 1.6 NAVIGATIONAL AIDS                             | 6     |
| 2. ICAO ANNEX 14 EVALUATION                       | 7     |
| 2.1 PURPOSE                                       | 7     |
| 2.2 ANNEX 14 OBSTACLE LIMITATION SURFACES (OLS)   | 8     |
| 2.3 AERODROME (RUNWAY) REFERENCE CODE             | 9     |
| 2.4 INFRINGEMENT OF OLS                           | 11    |
| 2.5 ANNEX 14 OLS ASSESSMENT – FAWN                | 11-21 |
| 3. FLIGHT PROCEDURES                              | 22    |
| 3.1 OIS AND OLS                                   | 22    |
| 3.2 INFORMATION ON ANY NEW OBSTACLE MUST INCLUDE: | 22    |
| 3.3 VISUAL AIDS FOR DENOTING OBSTACLES            | 22    |
| 3.4 PRECISION APPROACH PATH INDICATOR (PAPI)      | 23    |
| 3.5 DAYLIGHT MARKINGS                             | 23    |
| 4. CONCLUSION                                     | 23    |
| 5. ATTACHMENTS                                    | 24-28 |



## 1. INTRODUCTION

### 1.1 PURPOSE

- 1.1.1 This report details the Annex 14 obstacle assessment that was done concerning obstacles as surveyed by the survey team of ATNS, at Cape Winelands Airport, South Africa, as part of the initial WGS-84 survey project.
- 1.1.2 The report is based on all obstacles to investigate their influence on existing or future instrument procedures and whether these obstacles will have any effect on the Annex-14 surfaces. All obstacles were considered for the assessment to determine the effect on the aerodrome environment.
- 1.1.3 The effective utilisation of an aerodrome may be considerably influenced by natural features and man-made constructions inside and outside its boundary. These may result in limitations on the distance available for take-off and landing and on the range of meteorological conditions in which take-off and landing can be undertaken. For these reasons certain areas of the local airspace must be regarded as integral parts of the aerodrome environment. The degree of freedom from obstacles in these areas is very important.
- 1.1.4 An obstacle is defined as:
- Any object that stands on, or stands above, the specified surface of an obstacle restriction area which comprises the runway strips, runway end safety areas, clearways and taxiway strips; and.
  - Any object that penetrates the ICAO Annex 14 Obstacle Limitation Surfaces (OLS), a series of surfaces that set the height limits of objects, around an aerodrome.
- 1.1.5 The method of assessing the significance of any existing or proposed obstacle within the aerodrome boundary or in the vicinity of the aerodrome is to establish the defined ICAO Annex 14 Obstacle Limitation Surfaces (OLS) particular to a runway and its intended use. In ideal circumstances all the ICAO Annex 14 Obstacle Limitation Surfaces (OLS) will be free from obstacles, but when a surface is infringed, any safety measures required by the RSA CAA will have regard to:
- The nature of the obstacle and its location relative to the surface origin, to the extended centreline of the runway or normal approach and departure paths and to existing obstructions
  - The amount by which the surface is infringed;
  - The volume and type of air traffic at the aerodrome; and
  - The instrument approach procedures published for the aerodrome.



## 1.2 DATA USED

1.2.1 WGS-84 Survey Report for Cape Winelands Airport (ATNS Survey of 2022).

## 1.3 ELECTRONIC DATA

1.3.1 Obstacle data was obtained from ATNS Obstacle Evaluators Server (**V:\Obstacle Evaluators\ Obstacle Evaluations\ Other Airports\ FAWN\ FAWN 2022**). All this data was geodetically positioned into an eTOD and Microstation drawing file. This file was then established as the base drawing for the project.

## 1.4 UNITS USED

- All heights used in this design are in meters, unless specified otherwise.
- All bearings are true bearings, unless otherwise specified.

## 1.5 PROPOSED RUNWAY COORDINATES

TABLE 1: RUNWAY DATA

| Name      | Latitude            | Longitude            | Elevation |
|-----------|---------------------|----------------------|-----------|
| THR-RWY01 | S 33° 46' 29.97"    | E 018° 44' 30.22413" | 124.06m   |
| THR-RWY19 | S 33° 44' 44.23444" | E 018° 43' 57.49363" | 94.35m    |
| THR-RWY14 | S 33° 46' 15.44262" | E 018° 44' 20.84196" | 121.708m  |
| THR-RWY32 | S 33° 46' 26.02905" | E 018° 44' 48.37863" | 124.59m   |

## 1.6 PROPOSED NAVIGATIONAL AIDS

1.6.1 The following proposed navigation facilities will be installed at this airport:

- ILS (RWY 01)
- ILS (RWY 19)



## 2. ICAO ANNEX 14 EVALUATION

### 2.1 PURPOSE

- 2.1.1 The purpose of the Annex 14 Obstacle Limitation Surfaces (OLS) is to define the volume of airspace that should be ideally kept free or safeguarded from obstacles, and to take the necessary measures to ensure the safety of aircraft, and thereby the passengers and crews aboard them, while taking-off or landing, or while flying in the vicinity of an airport.
- 2.1.2 This is achieved by a process of checking proposed developments so as to:
- Protect the blocks of air through which aircraft fly, by preventing penetration of these surfaces' lower limits;
  - Protect the integrity of radar and other electronic aids to air navigation, by preventing reflections and diffractions of the radio signals involved;
  - Protect visual aids, such as Approach and Runway lighting, by preventing them from being obscured, or preventing the installation of other lights which could be confused for them;
- 2.1.3 Under the terms of their license, as issued by the RSA CAA, airports are normally required to prevent new developments or extensions to existing structures from infringing the OLS. The OLS completely surrounds the aerodrome, but those surfaces aligned with the runway(s) used to protect aircraft landing or taking-off can be more limiting than those surrounding the rest of the aerodrome, particularly as you get closer to the aerodrome.



## 2.2 ANNEX 14 OBSTACLE LIMITATION SURFACES (OLS)

2.2.1 In ideal circumstances all the surfaces will be free from obstacles, but when a surface is infringed, any safety measures required by the RSA CAA will have regard to:

- The nature of the obstacle and its location relative to the surface origin, to the extended centreline of the runway or normal approach and departure paths and to existing obstructions;
- The amount by which the OLS is infringed;
- The gradient presented by the obstacle to the surface origin;
- The volume and type of air traffic at the aerodrome; and
- The instrument approach procedures published for the aerodrome.

It is for this reason that accurate information on the location and height of the proposed development is required.

2.2.2 The specifications for the individual requirements are related by a two element reference code. In addition, specifications will vary with the designation of a runway as an instrument runway if it is served by one or more non-visual aids to approach and landing or as a visual runway, if it is not served by any non-visual aids to approach and landing. This ensures that the facilities and characteristics of an aerodrome are effectively related and match the needs of the aircraft for which the aerodrome intends to cater.

2.2.3 To determine the extent of the lateral, longitudinal, and sloping planes of the airspace and ground surfaces surrounding each runway that should be kept free of obstacles, a reference code is established. This code comprises of:

- A number determined by selecting the higher value of the declared TODA or ASDA.
- A letter which corresponds to the wingspan or main gear outer-wheel span, whichever is the more demanding, of the largest aircraft likely to be operating at the aerodrome.

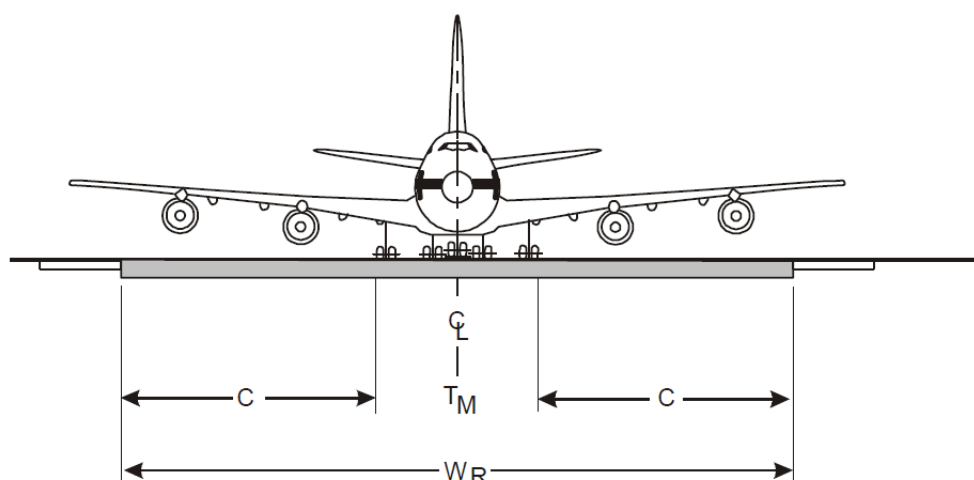
2.2.4 The determination of a runway's reference code is for the identification of the horizontal and vertical parameters of the Obstacle Limitation Surfaces (OLS) associated with that runway, and are not intended to influence the pavement strength.

## 2.3 AERODROME (RUNWAY) REFERENCE CODE

TABLE 2: AERODROME REFERENCE CODES

| Code element 1     |                                         |                    | Code element 2                    |                                                |
|--------------------|-----------------------------------------|--------------------|-----------------------------------|------------------------------------------------|
| Code number<br>(1) | Aeroplane reference field length<br>(2) | Code letter<br>(3) | Wingspan<br>(4)                   | Outer main gear wheel span <sup>a</sup><br>(5) |
| 1                  | Less than 800 m                         | A                  | Up to but not including 15 m      | Up to but not including 4.5 m                  |
| 2                  | 800 m up to but not including 1 200 m   | B                  | 15 m up to but not including 24 m | 4.5 m up to but not including 6 m              |
| 3                  | 1 200 m up to but not including 1 800 m | C                  | 24 m up to but not including 36 m | 6 m up to but not including 9 m                |
| 4                  | 1 800 m and over                        | D                  | 36 m up to but not including 52 m | 9 m up to but not including 14 m               |
|                    |                                         | E                  | 52 m up to but not including 65 m | 9 m up to but not including 14 m               |
|                    |                                         | F                  | 65 m up to but not including 80 m | 14 m up to but not including 16 m              |

a. Distance between the outside edges of the main gear wheels.





## 2.3.1 RUNWAYS

2.3.1.1 A runway is a rectangular area on a land aerodrome prepared for the landing and taking-off of aircraft. Separate criteria apply to a runway serving as a visual runway and to a runway serving as an instrument runway. The ability to meet the criteria will determine what length of runway may be declared for what purpose.

2.3.1.2 The length of runway provided is not directly determined by the Code. The aerodrome authority should declare distances for each runway direction. The declared distances are to be approved and promulgated by the RSA CAA.

## 2.3.2 Width

2.3.2.1 Runways both paved and unpaved should have the following minimum widths:

TABLE 3: RUNWAY WIDTHS

| Code number    | Code letter |      |      |      |      |      |
|----------------|-------------|------|------|------|------|------|
|                | A           | B    | C    | D    | E    | F    |
| 1 <sup>a</sup> | 18 m        | 18 m | 23 m | –    | –    | –    |
| 2 <sup>a</sup> | 23 m        | 23 m | 30 m | –    | –    | –    |
| 3              | 30 m        | 30 m | 30 m | 45 m | –    | –    |
| 4              | –           | –    | 45 m | 45 m | 45 m | 60 m |

a. The width of a precision approach runway should be not less than 30 m where the code number is 1 or 2.

2.3.2.2 The combinations of code numbers and letters for which widths are specified have been developed for typical aeroplane characteristics.

2.3.2.3 The width of a precision approach runway should be not less than 30 m where the code number is 1 or 2.



## 2.4 INFRINGEMENT OF OLS

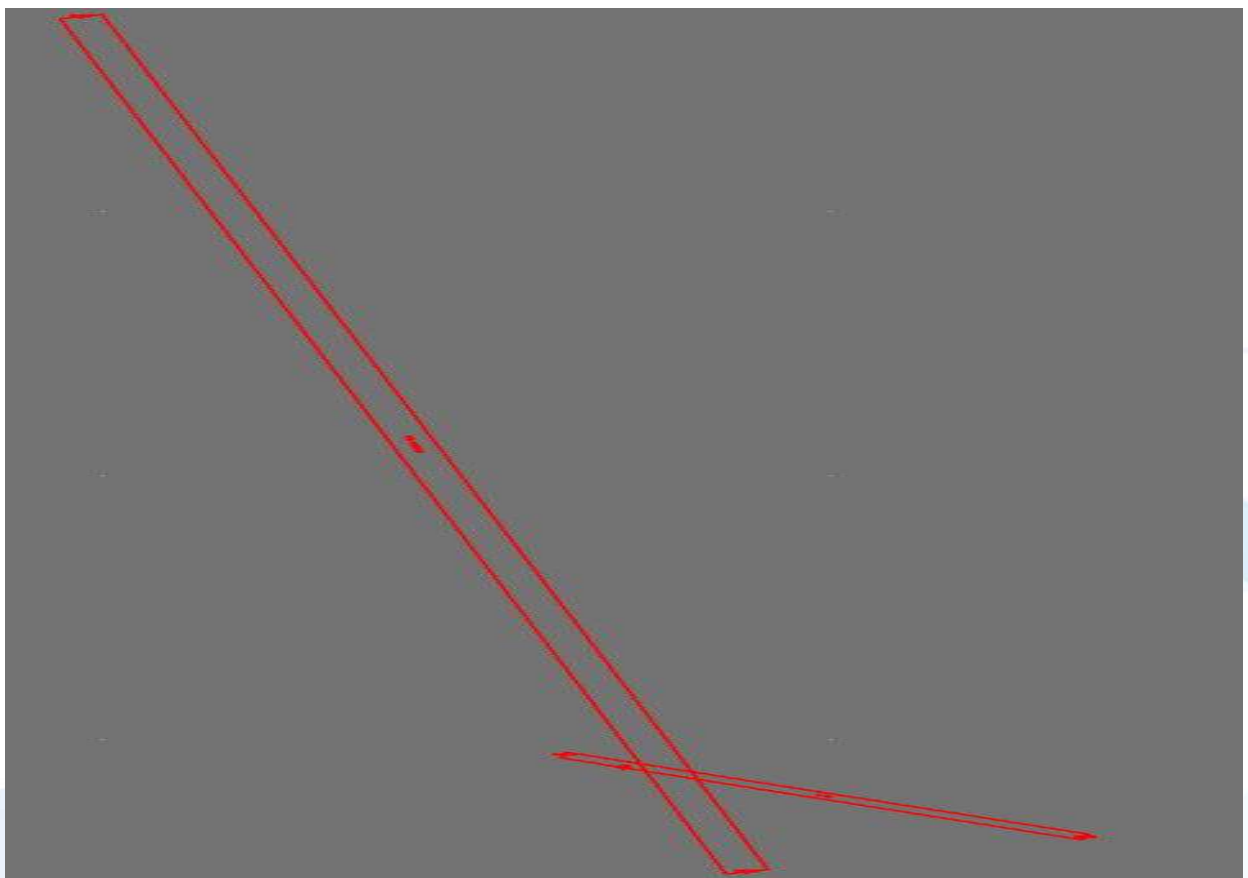
- 2.4.1 The aerodrome operator must monitor the OLS applicable to the aerodrome and report to the RSA CAA any infringement or potential infringement of the OLS.

***Note: Aerodrome operators need to liaise with appropriate planning authorities and companies that erect tall structures, to determine potential infringements. Every effort should be made to implement the OLS standards and limit the introduction of new obstacles.***

- 2.4.2 When a new obstacle is detected, the aerodrome operator must ensure that the information is passed on to pilots, through NOTAM, in accordance with the standards for aerodrome reporting procedures.

## 2.5 ANNEX 14 OBSTACLE LIMITATION SURFACES ASSESSMENT – FAWN

**Annex-14 surface parameters: RWY 01/19 and RWY 14/32**



**FIGURE 1: PROPOSED RUNWAY LAYOUT AT CAPE WINELANDS AIRPORT**

The following OLS are defined for Precision Runways:

- Strip
- Conical Surface
- Inner Horizontal Surface
- Outer Horizontal
- Inner Approach Surface
- Approach Surface
- Transitional Surface
- Inner Transitional Surface
- Balked Landing Surface
- Take Off Climb
- Take Off Path Area (TOFPA)

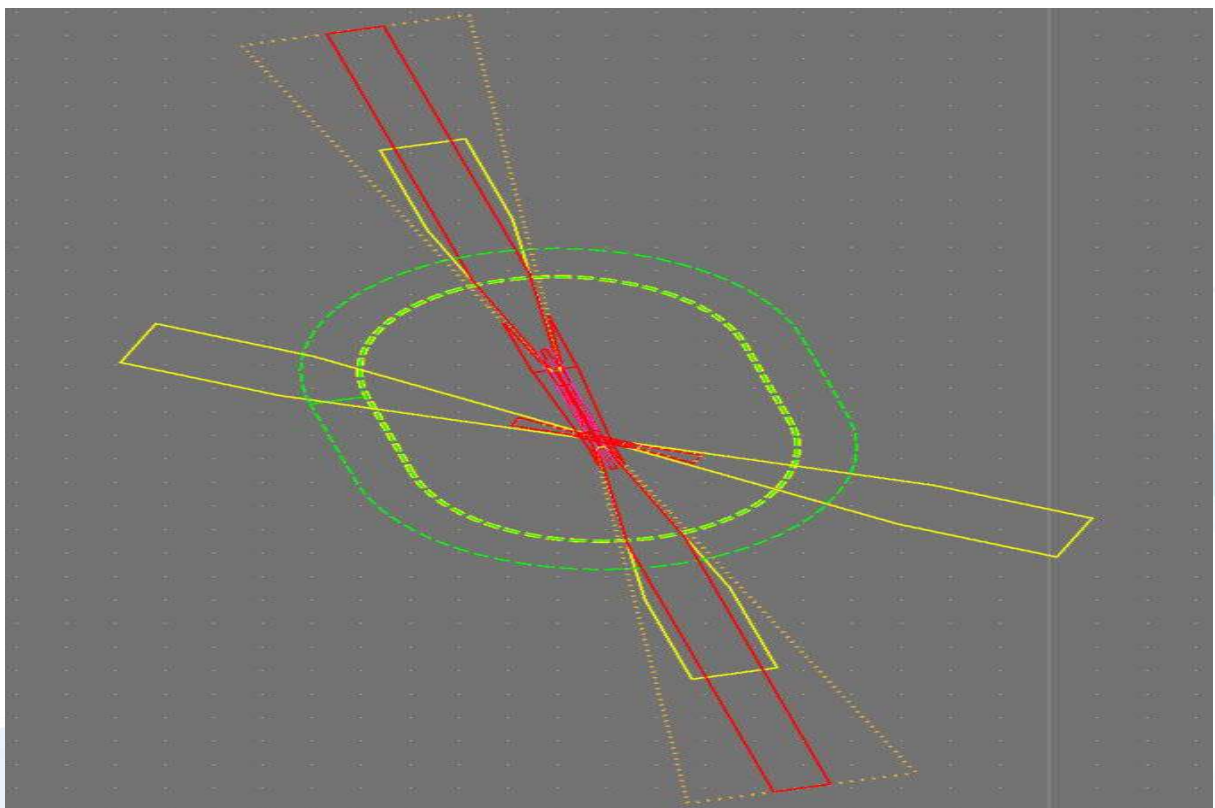


FIGURE 2: ANNEX 14 OBSTACLE LIMITATION SURFACES (OLS) AT CAPE WINELANDS AIRPORT



### 2.5.1 Runway data: RWY01

TABLE 4: RUNWAY 01 DIMENSIONS

| RWY 01 (FAWN)                        |                      |
|--------------------------------------|----------------------|
| Code                                 | 4                    |
| <b>THR01</b>                         |                      |
| Latitude                             | S 33° 46' 29.97"     |
| Longitude                            | E 018° 44' 30.22413" |
| Elevation                            | 124.06m              |
| <b>END01</b>                         |                      |
| Latitude                             | S 33° 44' 44.23444"  |
| Longitude                            | E 018° 43' 57.49363" |
| Elevation                            | 94.35m               |
| <b>Aerodrome</b>                     |                      |
| Datum elevation                      | 94.35m               |
| Code letter F                        | No                   |
| <b>Parameters</b>                    |                      |
| Approach type                        | Precision            |
| Departure Track Heading Change > 15° | No                   |
| Criteria applied                     | ICAO                 |

### Annex-14 surface parameters:

The broad purpose of the OLS is to define a volume of airspace that is ideally kept free of obstacles in order to minimise the danger to aircraft during the final visual segment of an instrument approach procedure.

TABLE 5: RUNWAY 01 OLS DIMENSIONS

| Strip            |         |
|------------------|---------|
| Length           | 3120 m  |
| Width            | 280 m   |
| Conical          |         |
| Slope            | 5 %     |
| Height           | 100 m   |
| Inner Horizontal |         |
| Height           | 45 m    |
| Radius           | 4000 m  |
| Outer Horizontal |         |
| Height           | 150 m   |
| Radius           | 15000 m |



| Inner Approach           |         |
|--------------------------|---------|
| Width                    | 120 m   |
| Distance from THR        | 60 m    |
| Length                   | 900 m   |
| Slope                    | 2 %     |
| Approach                 |         |
| Length of inner edge     | 300 m   |
| Distance from THR        | 60 m    |
| Divergence (each side)   | 15 %    |
| First Section            |         |
| Length                   | 3000 m  |
| Slope                    | 2 %     |
| Second Section           |         |
| Length                   | 3600 m  |
| Slope                    | 2.5 %   |
| Horizontal Section       |         |
| Length                   | 8400 m  |
| Total length             | 15000 m |
| Transitional             |         |
| Slope                    | 14.3 %  |
| Inner Transitional       |         |
| Slope                    | 33.3 %  |
| Balked Landing           |         |
| Length of inner edge     | 120 m   |
| Distance from THR        | 1800 m  |
| Divergence (each side)   | 10 %    |
| Slope                    | 3.33 %  |
| Take Off Climb           |         |
| Length of inner edge     | 180 m   |
| Distance from runway end | 60 m    |
| Divergence (each side)   | 12.5 %  |
| Final width              | 1200 m  |
| Length                   | 15000 m |
| Slope                    | 2 %     |



## 2.5.2 Runway data: RWY19

TABLE 6: RUNWAY 19 DIMENSIONS

| RWY 19 (FAWN)                        |                      |
|--------------------------------------|----------------------|
| Code                                 | 4                    |
| <b>THR19</b>                         |                      |
| Latitude                             | S 33° 44' 44.23444"  |
| Longitude                            | E 018° 43' 57.49363" |
| Elevation                            | 94.35m               |
| <b>END19</b>                         |                      |
| Latitude                             | S 33° 46' 29.97"     |
| Longitude                            | E 018° 44' 30.22413" |
| Elevation                            | 124.06m              |
| <b>Aerodrome</b>                     |                      |
| Datum elevation                      | 94.35m               |
| Code letter F                        | No                   |
| <b>Parameters</b>                    |                      |
| Approach type                        | Precision            |
| Departure Track Heading Change > 15° | No                   |
| Criteria applied                     | ICAO                 |

The following OLS are defined for Precision Approach Runway 19:

TABLE 7: RUNWAY 19 OLS DIMENSIONS

| Strip             |         |
|-------------------|---------|
| Length            | 3120 m  |
| Width             | 280 m   |
| Conical           |         |
| Slope             | 5 %     |
| Height            | 100 m   |
| Inner Horizontal  |         |
| Height            | 45 m    |
| Radius            | 4000 m  |
| Outer Horizontal  |         |
| Height            | 150 m   |
| Radius            | 15000 m |
| Inner Approach    |         |
| Width             | 120 m   |
| Distance from THR | 60 m    |
| Length            | 900 m   |
| Slope             | 2 %     |

| Approach                 |         |
|--------------------------|---------|
| Length of inner edge     | 300 m   |
| Distance from THR        | 60 m    |
| Divergence (each side)   | 15 %    |
| First Section            |         |
| Length                   | 3000 m  |
| Slope                    | 2 %     |
| Second Section           |         |
| Length                   | 3600 m  |
| Slope                    | 2.5 %   |
| Horizontal Section       |         |
| Length                   | 8400 m  |
| Total length             | 15000 m |
| Transitional             |         |
| Slope                    | 14.3 %  |
| Inner Transitional       |         |
| Slope                    | 33.3 %  |
| Balked Landing           |         |
| Length of inner edge     | 120 m   |
| Distance from THR        | 1800 m  |
| Divergence (each side)   | 10 %    |
| Slope                    | 3.33 %  |
| Take Off Climb           |         |
| Length of inner edge     | 180 m   |
| Distance from runway end | 60 m    |
| Divergence (each side)   | 12.5 %  |
| Final width              | 1200 m  |
| Length                   | 15000 m |
| Slope                    | 2 %     |

The following OLS are defined for Non-Instrument Runway:

- Strip
- Conical Surface
- Inner Horizontal Surface
- Approach Surface
- Transitional Surface
- Take Off Climb
- Take Off Path Area (TOFPA)



### 2.5.3 Runway data: RWY14

TABLE 8: RUNWAY 14 DIMENSIONS

| RWY 14 (FAWN)                        |                      |
|--------------------------------------|----------------------|
| Code                                 | 1                    |
| <b>THR14</b>                         |                      |
| Latitude                             | S 33° 46' 15.44262"  |
| Longitude                            | E 018° 44' 20.84196" |
| Elevation                            | 121.708m             |
| <b>END14</b>                         |                      |
| Latitude                             | S 33° 46' 26.02905"  |
| Longitude                            | E 018° 44' 48.37863" |
| Elevation                            | 124.59m              |
| <b>Aerodrome</b>                     |                      |
| Datum elevation                      | 121.708m             |
| Code letter F                        | No                   |
| <b>Parameters</b>                    |                      |
| Approach type                        | Non-Instrument       |
| Departure Track Heading Change > 15° | No                   |
| Criteria applied                     | ICAO                 |

The following OLS are defined for Non-Instrument Runway 14:

TABLE 9: RUNWAY 14 OLS DIMENSIONS

| Strip                  |        |
|------------------------|--------|
| Length                 | 900 m  |
| Width                  | 150 m  |
| Conical                |        |
| Slope                  | 5 %    |
| Height                 | 75 m   |
| Inner Horizontal       |        |
| Height                 | 45 m   |
| Radius                 | 4000 m |
| Approach               |        |
| Length of inner edge   | 150 m  |
| Distance from THR      | 60 m   |
| Divergence (each side) | 15 %   |
| First Section          |        |
| Length                 | 3000 m |
| Slope                  | 3.33 % |
| Transitional           |        |
| Slope                  | 14.3 % |

| Take Off Climb           |         |
|--------------------------|---------|
| Length of inner edge     | 180 m   |
| Distance from runway end | 60 m    |
| Divergence (each side)   | 12.5 %  |
| Final width              | 1200 m  |
| Length                   | 15000 m |
| Slope                    | 2 %     |

#### 2.5.4 Runway data: RWY32

TABLE 10: RUNWAY 32 DIMENSIONS

| RWY 32 (FAWN)                        |                      |
|--------------------------------------|----------------------|
| Code                                 | 1                    |
| <b>THR32</b>                         |                      |
| Latitude                             | S 33° 46' 26.02905"  |
| Longitude                            | E 018° 44' 48.37863" |
| Elevation                            | 124.59m              |
| <b>END32</b>                         |                      |
| Latitude                             | S 33° 46' 15.44262"  |
| Longitude                            | E 018° 44' 20.84196" |
| Elevation                            | 121.708m             |
| <b>Aerodrome</b>                     |                      |
| Datum elevation                      | 121.708m             |
| Code letter F                        | No                   |
| <b>Parameters</b>                    |                      |
| Approach type                        | Non-Instrument       |
| Departure Track Heading Change > 15° | No                   |
| Criteria applied                     | ICAO                 |

The following OLS are defined for Non-Instrument Runway 32:

TABLE 11: RUNWAY 32 OLS DIMENSIONS

| Strip            |        |
|------------------|--------|
| Length           | 900 m  |
| Width            | 150 m  |
| Conical          |        |
| Slope            | 5 %    |
| Height           | 75 m   |
| Inner Horizontal |        |
| Height           | 45 m   |
| Radius           | 4000 m |



| Approach                 |         |
|--------------------------|---------|
| Length of inner edge     | 150 m   |
| Distance from THR        | 60 m    |
| Divergence (each side)   | 15 %    |
| First Section            |         |
| Length                   | 3000 m  |
| Slope                    | 3.33 %  |
| Transitional             |         |
| Slope                    | 14.3 %  |
| Take Off Climb           |         |
| Length of inner edge     | 180 m   |
| Distance from runway end | 60 m    |
| Divergence (each side)   | 12.5 %  |
| Final width              | 1200 m  |
| Length                   | 15000 m |
| Slope                    | 2 %     |

## 2.5.5 Assessment Results: OBSTACLES

TABLE 12: THE OBSTACLES IN THE TABLE BELOW PENETRATE THE ANNEX-14 SURFACES FOR FAWN

| SURFACE            | TARGET | OBSTACLE     | PENETRATION | LATITUDE           | LONGITUDE           | ELEVATION |
|--------------------|--------|--------------|-------------|--------------------|---------------------|-----------|
| Balked Landing     | 01     | _RWY21 PP5   | -15.043     | S 33° 45' 32.9882" | E 018° 44' 10.2920" | 124.161   |
| Inner transitional | 01     | _HANGER_A1   | -4.492      | S 33° 46' 15.2485" | E 018° 44' 29.1453" | 133.502   |
| Inner transitional | 01     | _PP1         | -9.011      | S 33° 45' 54.6489" | E 018° 44' 22.1157" | 126.789   |
| Strip              | 01-19  | _FUEL FARM   | -10.055     | S 33° 46' 15.8166" | E 018° 44' 31.0346" | 130.433   |
| Strip              | 01-19  | _HANGER_2    | -5.676      | S 33° 46' 13.9655" | E 018° 44' 29.9791" | 125.507   |
| Strip              | 01-19  | _HANGER_A1   | -13.381     | S 33° 46' 15.2485" | E 018° 44' 29.1453" | 133.502   |
| Strip              | 01-19  | _MET STATION | -14.495     | S 33° 46' 04.8552" | E 018° 44' 23.1048" | 131.535   |
| Strip              | 01-19  | _PP1         | -12.493     | S 33° 45' 54.6489" | E 018° 44' 22.1157" | 126.789   |
| Strip              | 01-19  | _PP2         | -11.716     | S 33° 45' 55.5070" | E 018° 44' 23.9162" | 126.341   |
| Strip              | 01-19  | _RWY21 PP2   | -12.826     | S 33° 45' 34.6972" | E 018° 44' 18.0334" | 121.635   |
| Strip              | 01-19  | _RWY21 PP3   | -14.229     | S 33° 45' 34.0683" | E 018° 44' 15.1213" | 122.707   |
| Strip              | 01-19  | _RWY21 PP4   | -15.732     | S 33° 45' 33.5537" | E 018° 44' 12.8416" | 123.945   |
| Strip              | 01-19  | _RWY21 PP5   | -16.242     | S 33° 45' 32.9882" | E 018° 44' 10.2920" | 124.161   |
| Strip              | 01-19  | _RWY21_TREE1 | -25.23      | S 33° 45' 44.8538" | E 018° 44' 18.5602" | 136.744   |
| Strip              | 01-19  | _T64_BLD     | -7.88       | S 33° 45' 53.9976" | E 018° 44' 22.6102" | 122.033   |
| Strip              | 01-19  | _T65_BLD     | -7.875      | S 33° 45' 51.4390" | E 018° 44' 19.5945" | 121.182   |
| Strip              | 01-19  | _TREE_1      | -14.034     | S 33° 46' 16.9969" | E 018° 44' 32.0501" | 134.781   |
| Strip              | 01-19  | _TREE_2      | -16.232     | S 33° 46' 16.9874" | E 018° 44' 32.1565" | 136.983   |



|                |       |               |         |                    |                     |         |
|----------------|-------|---------------|---------|--------------------|---------------------|---------|
| Strip          | 01-19 | _WINDSOCK MID | -9.089  | S 33° 46' 19.7678" | E 018° 44' 25.8315" | 130.212 |
| Transitional   | 01    | _HANGER_3     | -6.551  | S 33° 46' 14.7972" | E 018° 44' 32.4135" | 129.829 |
| Transitional   | 01    | _PP3          | -10.472 | S 33° 45' 55.9201" | E 018° 44' 25.9506" | 126.209 |
| Transitional   | 01    | _RWY21 PP1    | -4.867  | S 33° 45' 35.3422" | E 018° 44' 20.9663" | 119.841 |
| Transitional   | 01    | _TANK_2       | -0.22   | S 33° 46' 13.7969" | E 018° 44' 34.6868" | 132.567 |
| Transitional   | 01    | _TREE_3       | -8.038  | S 33° 46' 17.0056" | E 018° 44' 34.0187" | 135.272 |
| Transitional   | 01    | _WATER TANK   | -2.685  | S 33° 46' 11.0727" | E 018° 44' 32.7418" | 130.280 |
| Transitional   | 01    | _HANGER_A4    | -4.349  | S 33° 46' 12.4504" | E 018° 44' 31.5988" | 126.649 |
| Transitional   | 01    | _OFFICE       | -5.433  | S 33° 46' 11.9595" | E 018° 44' 31.7976" | 128.865 |
| Balked Landing | 19    | _PP1          | -1.249  | S 33° 45' 54.6489" | E 018° 44' 22.1157" | 126.789 |
| Balked Landing | 19    | _RWY21_TREE1  | -21.698 | S 33° 45' 44.8538" | E 018° 44' 18.5602" | 136.744 |
| TOFPA          | 19    | _W_RESEVOIR   | -3.994  | S 33° 47' 33.2716" | E 018° 44' 46.1067" | 151.944 |
| Transitional   | 19    | _HANGER_3     | -6.551  | S 33° 46' 14.7972" | E 018° 44' 32.4135" | 129.829 |
| Transitional   | 19    | _PP3          | -10.472 | S 33° 45' 55.9201" | E 018° 44' 25.9506" | 126.209 |
| Transitional   | 19    | _RWY21 PP1    | -4.867  | S 33° 45' 35.3422" | E 018° 44' 20.9663" | 119.841 |
| Transitional   | 19    | _TANK_2       | -0.22   | S 33° 46' 13.7969" | E 018° 44' 34.6868" | 132.567 |
| Transitional   | 19    | _TREE_3       | -8.038  | S 33° 46' 17.0056" | E 018° 44' 34.0187" | 135.272 |
| Transitional   | 19    | _WATER TANK   | -2.685  | S 33° 46' 11.0727" | E 018° 44' 32.7418" | 130.280 |
| Transitional   | 19    | _HANGER_A4    | -4.349  | S 33° 46' 12.4504" | E 018° 44' 31.5988" | 126.649 |
| Transitional   | 19    | _OFFICE       | -5.433  | S 33° 46' 11.9595" | E 018° 44' 31.7976" | 128.865 |
| Take-off Climb | 14    | _RWY32_TREE4  | -11.374 | S 33° 46' 28.5783" | E 018° 44' 52.6322" | 141.078 |
| Take-off Climb | 14    | _RWY32_TREE5  | -4.528  | S 33° 46' 28.3862" | E 018° 44' 53.6418" | 135.288 |
| Take-off Climb | 14    | _RWY32_TREE6  | -2.914  | S 33° 46' 28.0738" | E 018° 44' 55.0798" | 135.154 |
| TOFPA          | 14    | _RWY32 F1     | -1.487  | S 33° 46' 26.0294" | E 018° 44' 49.0623" | 126.269 |
| TOFPA          | 14    | _RWY32_TREE2  | -15.309 | S 33° 46' 28.8997" | E 018° 44' 50.7390" | 141.005 |
| TOFPA          | 14    | _RWY32_TREE3  | -15.126 | S 33° 46' 28.7279" | E 018° 44' 51.7451" | 141.078 |
| TOFPA          | 14    | _RWY32_TREE4  | -14.901 | S 33° 46' 28.5783" | E 018° 44' 52.6322" | 141.078 |
| TOFPA          | 14    | _RWY32_TREE5  | -8.857  | S 33° 46' 28.3862" | E 018° 44' 53.6418" | 135.288 |
| TOFPA          | 14    | _RWY32_TREE6  | -8.368  | S 33° 46' 28.0738" | E 018° 44' 55.0798" | 135.154 |
| TOFPA          | 14    | _RWY32_TREE1  | -9.958  | S 33° 46' 29.1705" | E 018° 44' 49.1117" | 135.239 |
| Strip          | 14-32 | _RWY32 F1     | -1.679  | S 33° 46' 26.0294" | E 018° 44' 49.0623" | 126.269 |
| Transitional   | 14    | _TREE_1       | -2.608  | S 33° 46' 16.9969" | E 018° 44' 32.0501" | 134.781 |
| Transitional   | 14    | _TREE_2       | -4.519  | S 33° 46' 16.9874" | E 018° 44' 32.1565" | 136.983 |
| Transitional   | 14    | _WINDSOCK MID | -0.394  | S 33° 46' 19.7678" | E 018° 44' 25.8315" | 130.212 |
| Approach       | 32    | _RWY32_TREE4  | -11.374 | S 33° 46' 28.5783" | E 018° 44' 52.6322" | 141.078 |
| Approach       | 32    | _RWY32_TREE5  | -4.528  | S 33° 46' 28.3862" | E 018° 44' 53.6418" | 135.288 |
| Approach       | 32    | _RWY32_TREE6  | -2.914  | S 33° 46' 28.0738" | E 018° 44' 55.0798" | 135.154 |
| Transitional   | 32    | _RWY32_TREE2  | -9.558  | S 33° 46' 28.8997" | E 018° 44' 50.7390" | 141.005 |
| Transitional   | 32    | _RWY32_TREE3  | -12.119 | S 33° 46' 28.7279" | E 018° 44' 51.7451" | 141.078 |

|                  |      |                   |         |                    |                     |         |
|------------------|------|-------------------|---------|--------------------|---------------------|---------|
| Transitional     | 32   | _TREE_1           | -2.608  | S 33° 46' 16.9969" | E 018° 44' 32.0501" | 134.781 |
| Transitional     | 32   | _TREE_2           | -4.519  | S 33° 46' 16.9874" | E 018° 44' 32.1565" | 136.983 |
| Transitional     | 32   | _WINDSOCK MID     | -0.394  | S 33° 46' 19.7678" | E 018° 44' 25.8315" | 130.212 |
| Inner Horizontal | FAWN | _RWY01_PYLON MID1 | -6.241  | S 33° 48' 03.3797" | E 018° 45' 25.0766" | 145.591 |
| Inner Horizontal | FAWN | _RWY01_PYLON MID2 | -10.101 | S 33° 48' 03.9818" | E 018° 45' 09.9010" | 149.451 |
| Inner Horizontal | FAWN | _RWY01_PYLON MID3 | -7.808  | S 33° 48' 04.5311" | E 018° 44' 56.6150" | 147.158 |
| Inner Horizontal | FAWN | _RWY32_TREE2      | -1.655  | S 33° 46' 28.8997" | E 018° 44' 50.7390" | 141.005 |
| Inner Horizontal | FAWN | _RWY32_TREE3      | -1.728  | S 33° 46' 28.7279" | E 018° 44' 51.7451" | 141.078 |
| Inner Horizontal | FAWN | _RWY32_TREE4      | -1.728  | S 33° 46' 28.5783" | E 018° 44' 52.6322" | 141.078 |
| Inner Horizontal | FAWN | _STEEL TANK       | -3.989  | S 33° 46' 48.8511" | E 018° 43' 58.7999" | 143.339 |
| Inner Horizontal | FAWN | _W_RESEVOIR       | -12.594 | S 33° 47' 33.2716" | E 018° 44' 46.1067" | 151.944 |
| Conical          | FAWN | _TRANS_1 TWR      | -83.139 | S 33° 47' 21.1688" | E 018° 41' 46.3120" | 247.647 |
| Conical          | FAWN | _TRANS_2 TWR      | -87.374 | S 33° 47' 14.2176" | E 018° 41' 41.2943" | 254.510 |
| Conical          | FAWN | _TRANS_3 TWR      | -81.581 | S 33° 47' 18.4075" | E 018° 41' 32.9621" | 260.895 |

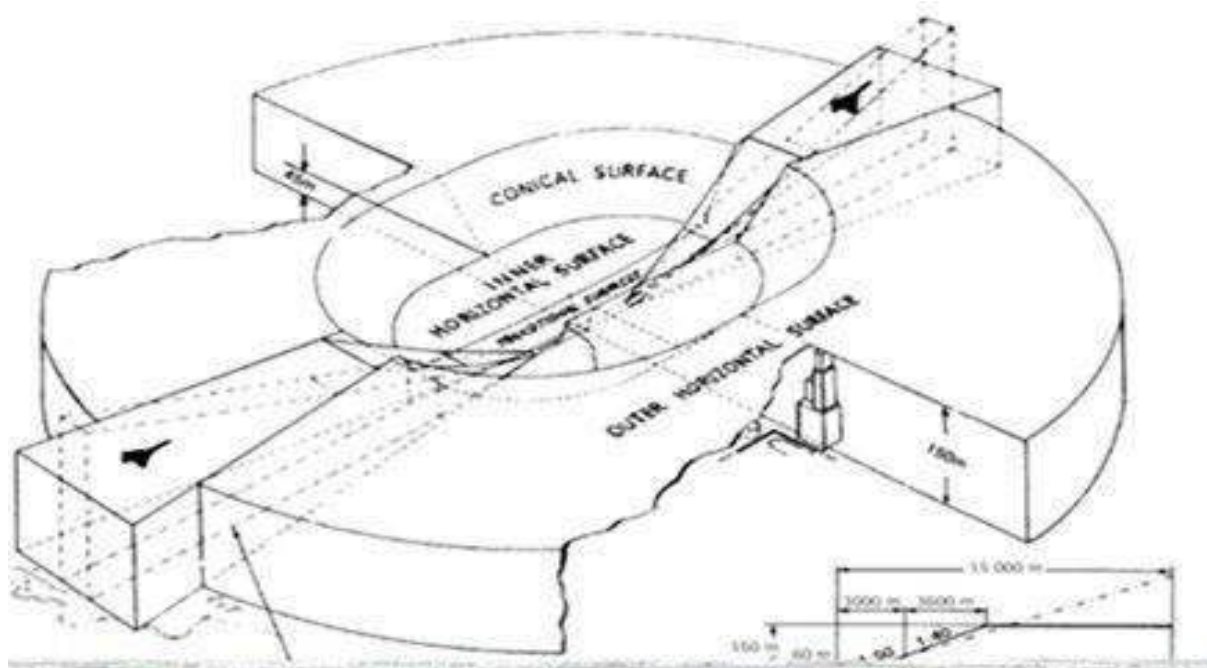


FIGURE 3: The Annex 14 volume 1 Obstacle Limitation Surfaces (OLS) shown in the picture above: protects aircraft for 15 KM radius around every aerodrome



### 3. FLIGHT PROCEDURES

#### 3.1 OIS AND OLS

- 3.1.1 The PANS-OPS Obstacle Identification Surfaces (OIS) are generally above the Annex 14 OLS and are designed to safeguard an aircraft from collision with obstacles when the aircraft's flight may be guided solely by instruments in conditions of poor visibility. They apply minimum obstacle clearance (MOC) to structures, terrain or other natural features within the areas to determine the limiting altitude at which a manoeuvre can be safely executed. As a result, PANS-OPS surfaces cannot be infringed under any circumstance.
- 3.1.2 In this respect, the OLS and PANS-OPS surfaces provide protection for aircraft operations in two quite different circumstances, the first when the pilot can see if there is an obstacle and the second when the pilot cannot.
- 3.1.3 The newly surveyed obstacles were evaluated against the present and newly designed procedures and found not to have any impact.

#### 3.2 INFORMATION ON ANY NEW OBSTACLE MUST INCLUDE:

- The nature of the obstacle — for instance structure or machinery;
- Distance and bearing of the obstacle from the start of the take-off end of the runway, if the obstacle is within the take-off area, or the ARP;
- Height of the obstacle in relation to the aerodrome elevation; and
- If it is a temporary obstacle — the time it is an obstacle.

#### 3.3 VISUAL AIDS FOR DENOTING OBSTACLES

- 3.3.1 The marking and/or lighting of obstacles are intended to reduce hazards to aircraft by indicating the presence of the obstacles. It does not necessarily reduce operating limitations which may be imposed by an obstacle.
- 3.3.2 Aeronautical Ground Lighting (AGL) provides flight crew with location, orientation and alignment information in adverse visibility conditions and at night. Below is a textual explanation of a Precision Approach Path Indicator (PAPI), as used by the pilot during final approach to land. The units are normally installed on the left hand side of the runway, viewed from the approach; a right hand installation is permitted if it is not practicable to position them on the left or if a second set is required.



### 3.4 PRECISION APPROACH PATH INDICATOR (PAPI).

#### 3.4.1 These are protected by:

- Preventing them from being obscured;
- Preventing the installation and display of other lights, particularly street lighting, in a pattern or colour which could be mistaken for visual aids;
- Preventing a high level of background lighting which could diminish their effectiveness;
- Preventing other lights which could confuse pilots.

3.4.2 All structures and buildings in and around an airport, treated as an obstacle, should be clearly marked and identified in accordance with the requirements of ICAO Annex 14, Chapter 6. Below is a textual explanation of the day and night markings of buildings and obstacles, in accordance with Annex 14.

### 3.5 DAYLIGHT MARKINGS

3.5.1 Steady burning, red, aeronautical low intensity type “A” obstruction lights must be fitted to the masts, to clearly define the outline of the structures, in accordance with the requirements of ICAO Annex 14, Chapter 6. The obstacles should be clearly marked for day and night operations as an obstruction, as per ICAO Annex 14 requirements.

## 4. CONCLUSION

4.1 All the obstacles listed in this report are **not clear** of the annex-14 surfaces, and need to be addressed (in terms of Annex-14 Lighting and Marking) to ensure that the proposed/future procedures at Cape Winelands Airport will be addressed.

4.2 We would like to recommend that this office be consulted on a regular basis before any installation of new structures in and around the aerodrome so that Annex-14 obstacle assessment can be done prior to installations.

4.3 Also, the PANS-OPS office should be consulted when there are modifications, painting and surface reconstructions at all airports.

**This concludes the ICAO Annex 14 Obstacle Assessment done for Cape Winelands Airport.**

This report was compiled by:

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T: 011 607 1132



## 5. ATTACHMENT A

### A.1 ALL SURVEY OBSTACLE DATA

| Obstacle                 | WGS-84 Lat.          | WGS-84 Long.          | Height<br>MSL(m) | Description                                                          |
|--------------------------|----------------------|-----------------------|------------------|----------------------------------------------------------------------|
| COMMCO TWR               | S334721.29248        | E0184218.463          | 135.047          | Measured on ground level. 43.454m AGL to top of lightning conductor. |
| CTC<br>MAST_FISANTE<br>K | S334720.34056        | E0184247.09688        | 117.985          | Measured on ground level. 26.904m AGL to top of lightning conductor. |
| DEEPKLOO_<br>HANGER      | S334610.61777        | E0184435.54492        | 127.895          | Measured on ground level. 6.700m AGL to top of hanger                |
| FLOOD_L1                 | S334706.47227        | E0184303.40684        | 135.777          | Measured on ground level. 40.124m AGL to top of lightning conductor. |
| FLOOD_L2                 | S334714.66681        | E0184256.83674        | 138.45           | Measured on ground level. 40.336m AGL to top of lightning conductor. |
| FUEL FARM                | S334615.81656        | E0184431.03463        | 130.433          | Measured on ground level. 8.100m AGL to top of tank.                 |
| HANGER_1                 | S334609.10341        | E0184436.34158        | 124.426          | Measured on ground level. 3.800m AGL to top of roof.                 |
| HANGER_2                 | S334613.96552        | E0184429.97911        | 125.507          | Measured on ground level. 3.500m AGL to top of hanger.               |
| <b>HANGER_3</b>          | <b>S334614.79724</b> | <b>E0184432.41353</b> | <b>129.829</b>   | <b>Measured on ground level. 7.300m AGL to top of hanger.</b>        |
| HANGER_4                 | S334615.40594        | E0184438.52656        | 126.625          | Measured on ground level. 4.000m AGL to top of hanger.               |
| HANGER_4 N               | S334614.85803        | E0184433.72924        | 127.804          | Measured on ground level. 5.000m AGL to top of roof apex.            |
| HANGER_5 N               | S334615.41126        | E0184435.08827        | 126.599          | Measured on ground level. 3.800m AGL to top of roof apex.            |

|                         |                      |                       |                |                                                                        |
|-------------------------|----------------------|-----------------------|----------------|------------------------------------------------------------------------|
| HANGER_5 S              | S334616.98842        | E0184438.64063        | 126.668        | Measured on ground level. 3.800m AGL to top of roof apex.              |
| HANGER_A1               | S334615.24846        | E0184429.14526        | 133.502        | Measured on ground level. 11.000m AGL to top of hanger.                |
| HANGER_A8               | S334608.84758        | E0184433.53343        | 124.998        | Measured on ground level. 3.800m AGL to top of roof.                   |
| MET STATION             | S334604.85519        | E0184423.10485        | 131.535        | Measured on ground level. 11.500m AGL to top of lightning conductor.   |
| <b>PP1</b>              | <b>S334554.64887</b> | <b>E0184422.11569</b> | <b>126.789</b> | <b>Measured on ground level. 8.600m AGL to top of power line pole.</b> |
| PP2                     | S334555.507          | E0184423.9162         | 126.341        | Measured on ground level. 9.100m AGL to top of power line pole.        |
| <b>PP3</b>              | <b>S334555.92009</b> | <b>E0184425.95057</b> | <b>126.209</b> | <b>Measured on ground level. 9.500m AGL to top of power line pole.</b> |
| PP4                     | S334556.53244        | E0184429.01251        | 125.148        | Measured on ground level. 8.700m AGL to top of power line pole.        |
| PP5                     | S334556.46701        | E0184429.185          | 125.138        | Measured on ground level. 8.700m AGL to top of power line pole.        |
| PP6                     | S334555.3199         | E0184432.04617        | 125.036        | Measured on ground level. 8.700m AGL to top of power line pole.        |
| PP7                     | S334553.49624        | E0184433.47765        | 124.315        | Measured on ground level. 9.200m AGL to top of power line pole.        |
| PP8                     | S334551.70701        | E0184434.88406        | 124.113        | Measured on ground level. 9.4\00m AGL to top of power line pole.       |
| PP9                     | S334549.76158        | E0184436.42592        | 123.498        | Measured on ground level. 8.700m AGL to top of power line pole.        |
| <b>RWY01_PYLON MID1</b> | <b>S334803.37967</b> | <b>E0184525.07657</b> | <b>145.591</b> | <b>Measured on ground level. 22.500m AGL bto top of pylon.</b>         |
| <b>RWY01_PYLON MID2</b> | <b>S334803.98179</b> | <b>E0184509.90096</b> | <b>149.451</b> | <b>Measured on ground level. 22.100m AGL bto top of pylon.</b>         |



|                         |                      |                       |                |                                                                        |
|-------------------------|----------------------|-----------------------|----------------|------------------------------------------------------------------------|
| <b>RWY01_PYLON MID3</b> | <b>S334804.53109</b> | <b>E0184456.61499</b> | <b>147.158</b> | <b>Measured on ground level. 21.500m AGL bto top of pylon.</b>         |
| RWY01_PYLON MID4        | S334805.19188        | E0184439.89617        | 130.342        | Measured on ground level. 21.500m AGL bto top of pylon.                |
| RWY14 F1                | S334612.12747        | E0184416.25047        | 122.679        | Measured on ground level. 1.700m AGL to top of fence.                  |
| RWY14 F2                | S334612.31205        | E0184416.18311        | 122.71         | Measured on ground level. 1.700m AGL to top of fence.                  |
| <b>RWY32 F1</b>         | <b>S334626.02941</b> | <b>E0184449.06228</b> | <b>126.269</b> | <b>Measured on ground level. 1.700m AGL to top of fence.</b>           |
| <b>RWY21 PP1</b>        | <b>S334535.34217</b> | <b>E0184420.96631</b> | <b>119.841</b> | <b>Measured on ground level. 9.100m AGL to top of power line pole.</b> |
| RWY21 PP2               | S334534.69724        | E0184418.03338        | 121.635        | Measured on ground level. 9.100m AGL to top of power line pole.        |
| RWY21 PP3               | S334534.06829        | E0184415.12133        | 122.707        | Measured on ground level. 9.100m AGL to top of power line pole.        |
| RWY21 PP4               | S334533.5537         | E0184412.84157        | 123.945        | Measured on ground level. 9.100m AGL to top of power line pole.        |
| RWY21 PP5               | S334532.98821        | E0184410.29199        | 124.161        | Measured on ground level. 9.100m AGL to top of power line pole.        |
| <b>RWY21_TREE1</b>      | <b>S334544.8538</b>  | <b>E0184418.56021</b> | <b>136.744</b> | <b>Measured on ground level. 21.800m AGL to top of tree.</b>           |
| <b>RWY32_TREE2</b>      | <b>S334628.89975</b> | <b>E0184450.73903</b> | <b>141.005</b> | <b>Measured on ground level. 15.800m AGL to top of tree.</b>           |
| <b>RWY32_TREE3</b>      | <b>S334628.72793</b> | <b>E0184451.7451</b>  | <b>141.078</b> | <b>Measured on ground level. 15.800m AGL to top of tree.</b>           |
| <b>RWY32_TREE4</b>      | <b>S334628.57828</b> | <b>E0184452.63218</b> | <b>141.078</b> | <b>Measured on ground level. 15.800m AGL to top of tree.</b>           |
| <b>RWY32_TREE5</b>      | <b>S334628.38623</b> | <b>E0184453.6418</b>  | <b>135.288</b> | <b>Measured on ground level. 10.000m AGL to top of tree.</b>           |



|                    |                      |                       |                |                                                                             |
|--------------------|----------------------|-----------------------|----------------|-----------------------------------------------------------------------------|
| <b>RWY32_TREE6</b> | <b>S334628.07383</b> | <b>E0184455.07977</b> | <b>135.154</b> | <b>Measured on ground level. 10.000m AGL to top of tree.</b>                |
| <b>RWY32_TREE1</b> | <b>S334629.1705</b>  | <b>E0184449.11172</b> | <b>135.239</b> | <b>Measured on ground level. 10.000m AGL to top of tree.</b>                |
| TANK_2             | S334613.7969         | E0184434.68682        | 130.847        | Measured on ground level. 10.000m AGL to top of water tank.                 |
| SENTEC TWR         | S334201.75182        | E0184227.4831         | 189.462        | Measured on ground level. 117.644m AGL to top of tower.                     |
| <b>STEEL TANK</b>  | <b>S334648.8511</b>  | <b>E0184358.79987</b> | <b>143.339</b> | <b>Measured on ground level. 23.600m AGL to top of tank.</b>                |
| T64_BLD            | S334553.99756        | E0184422.6102         | 122.033        | Measured on ground level. 4.600m AGL to top of building.                    |
| T65_BLD            | S334551.43899        | E0184419.59449        | 121.182        | Measured on ground level. 3.800m AGL to top of building.                    |
| T66_BLD            | S334555.85039        | E0184428.48304        | 120.26         | Measured on ground level. 4.100m AGL to top of building.                    |
| <b>TRANS_1 TWR</b> | <b>S334721.16879</b> | <b>E0184146.31199</b> | <b>247.647</b> | <b>Measured on ground level. 150.000m AGL to top of tower.</b>              |
| <b>TRANS_2 TWR</b> | <b>S334714.21765</b> | <b>E0184141.2943</b>  | <b>254.51</b>  | <b>Measured on ground level. 150.000m AGL to top of tower.</b>              |
| <b>TRANS_3 TWR</b> | <b>S334718.40755</b> | <b>E0184132.96212</b> | <b>260.895</b> | <b>Measured on ground level. 150.000m AGL to top of tower.</b>              |
| <b>TREE_1</b>      | <b>S334616.99688</b> | <b>E0184432.05008</b> | <b>134.781</b> | <b>Measured on ground level. 12.000m AGL to top of tree.</b>                |
| <b>TREE_2</b>      | <b>S334616.98738</b> | <b>E0184432.15648</b> | <b>136.983</b> | <b>Measured on ground level. 14.300m AGL to top of tree.</b>                |
| <b>TREE_3</b>      | <b>S334617.00559</b> | <b>E0184434.01872</b> | <b>135.272</b> | <b>Measured on ground level. 12.000m AGL to top of tree.</b>                |
| <b>W_RESEVOIR</b>  | <b>S334733.27165</b> | <b>E0184446.10675</b> | <b>151.944</b> | <b>Measured on ground level. 27.854m AGL to top of lightning conductor.</b> |



|                     |                      |                       |                |                                                                         |
|---------------------|----------------------|-----------------------|----------------|-------------------------------------------------------------------------|
| <b>WATER TANK</b>   | <b>S334611.07268</b> | <b>E0184432.74179</b> | <b>130.28</b>  | <b>Measured on ground level. 8.700m AGL to top of tank.</b>             |
| <b>WINDSOCK MID</b> | <b>S334619.76778</b> | <b>E0184425.83146</b> | <b>130.212</b> | <b>Measured on ground level. 7.400m AGL to top of pole.</b>             |
| <b>TANK_2</b>       | <b>S334613.7969</b>  | <b>E0184434.68682</b> | <b>132.567</b> | <b>Measured on ground level. 10.000m AGL to top of water tank.</b>      |
| <b>HANGER_A3</b>    | <b>S334611.05434</b> | <b>E0184432.33481</b> | <b>125.596</b> | <b>Measured on ground level. 4.000m AGL to top of hanger roof.</b>      |
| <b>HANGER_A4</b>    | <b>S334612.45042</b> | <b>E0184431.59879</b> | <b>126.649</b> | <b>Measured on ground level. 4.600m AGL to top of hanger roof.</b>      |
| <b>OFFICE</b>       | <b>S334611.95953</b> | <b>E0184431.79759</b> | <b>128.865</b> | <b>Measured on ground level. 6.900m AGL to top of office roof apex.</b> |